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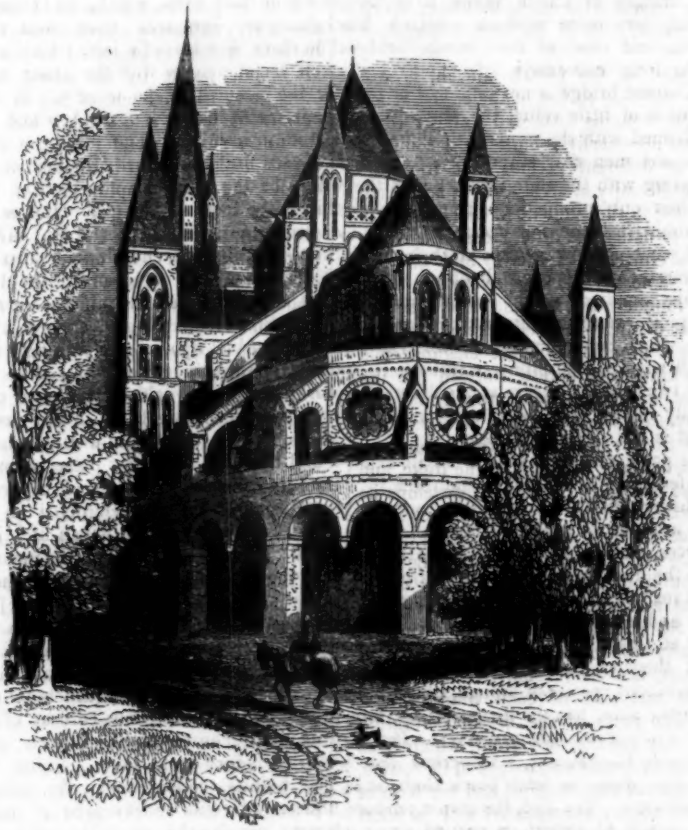
THE ABBEY AND CHURCH OF ST. ETIENNE, AT CAEN.



[The Abbey of St. Etienne (Stephen), Normandy.]

THE abbey of St. Etienne (or St. Stephen) was the second of two magnificent religious houses founded by William the Conqueror and his wife at Caen, to appease the ecclesiastical power, which he had grievously offended by his marriage with Matilda. It was built upon some ground purchased by the duke, east of the city, and on the site, it is believed, of a previously existing chapel and royal mansion. The works were commenced a little after those of the abbey of Sainte Trinité (the other religious foundation to which we have alluded), but carried on much more slowly, for William at the time was meditating the conquest of England, an expedition demanding nearly all his means.

In 1070, Lanfranc, a celebrated monk, and prior of the abbey of Bec, was named the first abbot of St. Etienne, and charged with the superintendence of the building. On the conquest of England, Lanfranc was made archbishop of Canterbury, and William Bonne-Ame appointed to succeed him in the abbey. He finished the works, and in a manner that fully justified the trust reposed in his hands. The consecration took place in 1077, and was attended with all the pomp and splendour that the genius of the time could devise, and in the presence of an immense concourse of prelates and distinguished persons. In order to render the ceremony more imposing, William caused to be brought from Besançon the reliques of St. Stephen, whom he had chosen to be the patron of the new monastery; and, according to the historians of the time, various miracles took place in consequence, on the occasion. Rights, privileges, magnificent presents, and immense estates were showered upon the abbey, whilst William, in addition, set an enamelled cup, ornamented with precious stones and antique medals, upon the altar, in which the charter was contained. This cup, with other valuable articles, such as his crown, sceptre, &c., William bequeathed to the monastery at his death.*

Of the original habitations of the monks there are now no remains; but it is well known that they were large and magnificent. The only buildings of this character that yet exist are but restorations. Such is the edifice

* This cup is still in existence, and belongs to M. l'Abbé de la Rue, author of 'Historical Essays on the City of Caen.' In diameter it is about eight inches, of a vase-like form, standing upon a foot or pedestal, is decorated with precious stones, with forty Roman medals, and one Grecian, which forms the bottom of the vase.

vulgarly called Duke William's palace, and such is that known by the name of the Hall of State. Amongst the venerable ruins of the abbey, this last building chiefly attracts the attention of the curious. Its form is an oblong square; it is lofty, and has octagonal turrets at the four corners rising to the top of the building, where they are crowned by elegant lanterns. The windows are set in lofty pointed niches, most of them now walled up. The interior consisted of two halls on the first story, one of which has been remarkable for its immense size, the boldness of its vaulted roof, the beauty of its painted windows, and the singularity of its mosaic pavement, displaying the arms or escutcheons of many old Norman families. But in the present state of the building, which is now used as a magazine, little of its former splendour is to be recognised.

The church, now used as the parish church, is still the most considerable religious edifice of the city. Much of the original structure remains unaltered; and if some parts, which have been necessarily rebuilt on account of the injuries received at different periods, take from the church its primitive uniformity of style, the variety which has resulted is valuable to the student in the history of art. It is interesting to notice the differences which prevail between the two churches of Ste. Trinité and St. Etienne, built at the same period, possibly by the same architect. The first, founded by Matilda, and occupied by the oldest and most distinguished families of the province, united to its lesser proportions more elegance and fancy, and presents a kind of elaborate study in the use of ornaments borrowed from the Moors, the Arabs, and the Saxons, a medley, the taste for which had been recently introduced into the art in Europe; the second, on the contrary, more particularly the work of the duke, and destined for the monks and people generally, develops its parts on a vaster scale, with a more manly vigorous character, and presents in the exterior all that gravity, even rudeness, of style, which we understand by the term Lombard. In the church of St. Etienne, we may say in few words, "grandeur and solidity appear to the exclusion of elegance."* St. Etienne is built in the form of a cross. It had originally three apsides,† the principal of which, at the east end, has been removed; the others were attached to the east side of each transept, and these still remain. The parts of the original building which remain to this day are the west front, which is so greatly admired for the nobleness and height of its towers, the nave, the central part of the transept, and the base of the tower, which rises above, surmounted with a short conical spire. The western front is divided by buttresses into three parts, above the outer two of which rise the towers, with their tall octagonal spires. The eastern end of the church is very magnificent, with its wide semicircular sweep, and slender turrets, having almost the air of an oriental mosque. This part was entirely rebuilt towards the commencement of the thirteenth century, and is valuable, apart from its intrinsic grandeur, as an example of the direction then taking by the architectural artists towards that period, in the fourteenth, fifteenth, and sixteenth centuries, which produced so many edifices, admirable for the lightness of their masses, the profusion of their details, and for the flexibility then first given to stone, as evidenced in the delicacy and variety of the workmanship produced. A Latin inscription on the wall records the architect of this portion of the church, which may be thus rendered:—

> "Here lies William, the very highest in the art of working in stone.
> He perfected this new work. Christ give him a perpetual reward. AMEN."

The inscription bears no date.

The interior, without losing the austere character which prevails without, is more noble and less heavy. The Roman style is the prevalent one, and the Corinthian capital is found here in almost all its purity. Vast galleries, with the openings ornamented with balustrades, extend along on both sides, which, on occasions of great public ceremonies, were seen filled with countless spectators. The choir, which is of a later date than the nave, connects itself harmoniously with the latter, and is distinguished for the richness of its tracery. It is terminated by a semicircular chancel, around which are some chapels, eleven in number. The beauty of the painted windows has been much and justly spoken of. One of the curiosities of the interior is an object of the highest interest; this is the tomb of the Conqueror, who was buried here, enclosing a portion of his body. The first mausoleum that stood in the church was raised by Robert, son of William, and his successor in the duchy of Normandy. This was of the most magnificent character. It consisted of a black sarcophagus, erected upon four pillars of white marble, upon which is a recumbent figure of the duke, clothed in royal habit, the whole enriched with workmanship in gold of the most precious kind. The coffin was opened in 1522, in the presence of a cardinal, an archbishop, and many distinguished ecclesiastics, who found the body in perfect preservation, and of a most extraordinary size. A table of copper or brass was also found, upon which was engraved an inscription relating to the great event of William's life, the conquest of England. In order to preserve the memory of this transaction, they placed the inscription on the wall, with a painting upon wood, by the most able artist of the town, representing the body in the state in which it was found. The sarcophagus was then carefully closed. It was, however, soon broken open again, and with less respectful hands. In 1562 the Huguenots pillaged and devastated all the principal religious edifices of Caen, including the abbey and church of St. Etienne, which they attacked with such fury as to leave nothing but the bare walls. The pulpits, coffers, books, &c. were burnt: they even undermined and endeavoured to pull down the central tower; nor did they spare the coffin of the duke, for they opened and scattered about its contents. Some of the bones were, however, carefully gathered together and replaced under a new cenotaph, very nearly resembling that which the Abbess Francoise de Fromlay restored about the same period over the similarly outraged ashes of Matilda, in the church of Ste. Trinité. The second tomb, removed from the choir into the chancel in 1742, was destroyed during the French revolution in 1793, and the marble only which covered it now remains.

The abbey and church have not only suffered from the causes we have mentioned, but also from the sieges and assaults which at different times have harassed the city. Thus in 1415 our own countrymen, under the command of the Duke of Clarence, seized the abbey; and when, a few days after, king Henry V. besieged the town, he placed artillery in the lower portion of the central tower of the church from whence he battered the city, which was ultimately taken by assault. The tower was so greatly injured on this occasion as to require rebuilding, and the abbey generally experienced considerable damage. In 1434 the Norman people endeavoured to throw off the English yoke; they assembled to the number of more than 50,000 men, and seized the abbey, of which they destroyed the fortifications. But opposed by the season,

* 'Description Historique et Critique, et Vues des Monuments Religieux et Civils les plus remarquables du Département du Calvados,' &c., by T. Jolimont, Paris, 1825. To this excellent work we are principally indebted for the materials of the present article.

† An apsis is the semicircular recess which invariably formed the east termination of the primitive churches, and which was borrowed from the Roman halls of justice. In the one the apsis was occupied by the bishop and the priests, in the other by the prætor and judges

and being without provisions or artillery, the attempt failed. They retired in disorder, followed by the English, who then pillaged the monastery and church, carrying off all their moveables. Our countrymen were at last expelled from Caen, in 1450, by Charles VII., who, during the struggle, took up his position in the abbey, not much, as we may readily divine, to the advantage of the already greatly injured edifice. The abbey buildings are now used for the purposes of a college or high school.

ON GAMBOGE.

In the vegetable world there are certain trees which, from incisions made in the branches, stems, and roots, exude a milky sort of juice, which gradually hardens on exposure to the air. This juice is formed of resin and an essential oil, which are suspended by water containing gum and other vegetable substances in solution. When this juice has become solid it is called gum resin, of which there are several varieties. On the present occasion, however, we propose to draw the reader's attention to one very remarkable variety, viz. gamboge, first referring him to the 'Penny Magazine,' vol. vi., p. 435, where, in an article on sealing-wax, the chief points of distinction between wax and resin are pointed out.

Gamboge, or, as it is sometimes called, camboge, derives its name from Camboja, a river in Siam, in the vicinity of which the substance occurs plentifully. Considerable doubt has long existed as to the tree from which gamboge is procured; and it is but very recently that a botanical description of the tree has been given. The gamboge-tree is referred to the tribe of *Guttiferæ*, that is, trees whose sap concretes in guttæ or drops. The *Stalagmites Cambogioides* is a native of Ceylon, Siam, and Cochin-China, where it attains a considerable size. Its leaves are narrow pointed, its flowers yellow, its fruit of an oblong shape and of a beautiful gold colour, and the stem has a yellow bark similar to the gum resin which it produces. The districts in Siam yielding gamboge correspond generally with those affording pepper and cardamums, that is, at about the latitude of ten or twelve degrees on the east coast of the Gulf of Siam.

There are two modes by which the juice is procured. In Siam the leaves and young shoots of the tree are broken off and bruised, which causes a yellow juice to exude in small tears or drops. These drops are received into cocoa-nut shells or earthern jars, and being exposed to the heat of the sun, are allowed to thicken. The finest sort, called pipe gamboge of Siam, is formed by pouring the thickened juice into the hollow cavities of bamboo, which gives it a cylindrical form. Another portion is mixed with other substances, made up into round cakes (sometimes with a hole in the centre), wrapped up in flag-leaves, and so imported to Europe in boxes. This is called the "cake gamboge" of Siam. Mr. Crawfurd, in his 'Embassy to Siam,' says that the districts which yield this production deliver to the kings of Siam, Camboja, and Cochin-China fixed quantities of it yearly as tax or tribute.

In Ceylon, the tree from which is obtained an inferior kind of gamboge is known botanically as the *Xanthochymus ovalifolius*. The natives wound the stems of this tree with sharp stones, and the juice begins to flow slowly. It is obtained more abundantly by the application of warmth, for which purpose a number of fires are kindled near the tree. Dr. Christison states that Ceylon gamboge is not now an article of commerce in Europe, and that all that we have comes from China.

There are other trees producing yellow juices, which, by evaporation, form substances very similar to gamboge. Mr. Royle, in his 'Flora of the Himalaya,' mentions one, of which the juice, in its crude and unprepared state, is superior to every other kind, but not so permanent.

The colour of gamboge varies with the season, with the age of the tree, and with the part of the tree from which the juice is procured. Siamese gamboge is sold in pieces of various sizes: externally it is of a dirty yellowish brown colour, covered with a fine yellow powder. When broken, it exhibits a shell-like or a vitreous fracture, with a dark yellow colour.

Gamboge is rather heavier than water. It has little or no smell except when heated, and then the smell is peculiar. It has no decided taste in the mouth unless it be chewed for some time. It dissolves largely in alcohol; as also, but in less proportion, in æther; and with the former it yields a clear gold-coloured fluid, which becomes turbid on the addition of water. The tincture thus formed constitutes one of the ingredients of the gold-coloured lacquer which so much improves the appearance of smaller articles of brass-work. It also enters into the composition of gold-coloured varnish, with which many of our manufactures in white wood are overlaid. It is also used to stain wood in imitation of box-wood; and is said to have the effect of imparting a beautiful and tolerably durable yellow stain to marble.

Gamboge is not, properly speaking, soluble in water, but is diffusible, forming therewith an emulsion, in which the resin is suspended by the gum: in this case it is of an opaque yellow, and is largely used as a water-colour pigment. Gamboge is soluble in alkaline solutions, and the resulting compound is not rendered turbid by water; it is, however, instantly decomposed by acids, and the precipitate thus formed is of an exceedingly brilliant yellow colour. Gamboge is fusible and inflammable: when ignited, it blazes, throws out sparks, and emits a dense black smoke.

A remarkable appearance is presented by a drop of the aqueous infusion, or of the alcoholic solution of gamboge, when viewed through a microscope of tolerably high power. The drop exhibits an immense number of minute particles moving about with great and unceasing velocity as if endued with life: this appearance is most striking with a drop of the tincture containing a slight excess of gamboge. This phenomenon we do not profess to explain, but it closely resembles the rapid rotatory motion of minute pieces of camphor on the surface of pure water, which can be easily viewed without the assistance of a microscope.

Gamboge acts with much violence as a medical agent; indeed its laxative effects are such that it is now not much employed in medicine, except in certain quack preparations which are often followed by dangerous consequences. It is sometimes used, improperly, by confectioners to colour their liqueurs.

Gamboge appears to have been first known in Europe about the year 1600. The quantity at present imported into England is about seven or eight thousand pounds annually.

Natives of Australia.—These savages have a power of manipulating with their toes, so as to do many things surprising to the men who wear shoes. This power they acquire chiefly by ascending trees from their infancy, their mode of climbing depending as much on the toes as the fingers. With their toes they gather fresh-water muscles (*unio*) from the muddy bottom of rivers or lagoons; and the heaps of these shells beside their old fire-places, which are numerous along the banks, show that this shell fish is the daily food of at least the gins and children. In their attempts to steal from us, their toes were much employed. They would tread softly on any article, seize it with the toes, pass it up the back, or between the arm and side, and so conceal it in the arm-pit, or between the beard and throat.—*Mitchell's Eastern Australia.*

DRUIDICAL REMAINS.—No. III.

(Continued from No. 536.)

[Cromlech at Plas Newydd, Anglesey.]

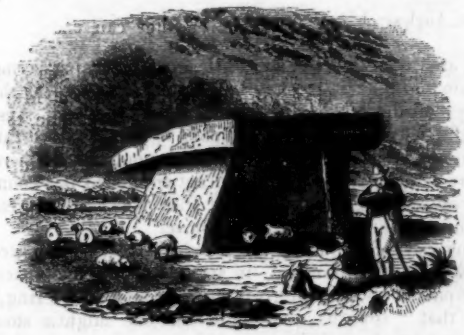
Two derivations have been given for the word Cromlech: the one, 'an inclining stone,' from the British word *crwm*, bowed, and *llech*, a broad flat stone; and the other, 'a devoted stone or altar,' from the Hebrew *Cæræm-luach;*—the first expressing the appearance of the upper and principal stone of the cromlech; the second, the horrible use to which there is great reason to believe it was put. This 'broad flat stone' is generally supported on three smaller ones, that number being chosen, according to the ingenious idea of Borlase, on account of the much greater ease of fixing the incumbent stone securely, which would find its own level on the irregular surfaces of three stones; but which, were there four or more, would require to have its under surface accurately planed, in order that it might rest equally on its supporters, whilst these too must necessarily have been of precisely the same height. In strict accordance with this idea, we find the covering stone always more or less shelving. Borlase and other writers have contended that the cromlechs were sepulchral monuments, but in answer to this it has been pointed out—1st, that in many cromlechs which have been examined, no human remains have been found; 2nd, that they are sometimes reared on the unbroken rock; and 3rd, Sir Richard Hoare mentions that on a field in the road from Newport to Fishguard there are placed within a circle of stones five kist-vaens also in a circle and enclosing a single cromlech; bones, charcoal, &c. have been found beneath the kist-vaens, but nothing of the kind under the cromlech. The other hypothesis is, that they were altars on which the priests offered their dreadful sacrifices. On this subject Cæsar has the following remarks:—"The whole nation of the Gauls is much addicted to religious observances, and on that account, those who are attacked by any of the more serious diseases, and those who are involved in the danger of warfare, either offer human sacrifices or make a vow that they will offer them, and they employ the Druids to officiate at these sacrifices; for they consider that the favour of the immortal gods cannot be conciliated, unless the life of one man be offered up for that of another: they have also sacrifices of the same kind appointed on behalf of the state." To which we may add, that Tacitus, in his account of the Roman attack on Mona, or the isle of Anglesey, the then great stronghold of the British Druids, states that "they held it right to smear their altars with the blood of their captives, and to consult the will of the gods by the quivering of human flesh." It is a striking corroboration of the theory that the cromlechs were the altars on which these dreadful sacrifices were performed, to find that in this very isle of Anglesey are yet existing, among many others, the two largest and most magnificent cromlechs our country possesses. They are both at Plas Newydd; an engraving of one of them is given above.

This view of the use of the cromlech is also supported by tradition. Holinshed, in speaking of some places "compassed about with great stones, round like a ring," adds that "towards the south was one mightie stone farre greater than all the rest, pitched up in manner of an altar, whereon their priests might offer sacrifices in honour of their gods." Nor is this tradition confined to our own country. In Mallett's 'Northern Antiquities' we find the following passage:—"Although we want the greater part of the monuments which might instruct us in that primitive stage of their religion, the traces of it are not entirely destroyed. We find at this day, here and there, in Denmark, Sweden, and Norway, in the middle of a plain, or upon some little hill, altars, around which they assembled to offer sacrifices and to assist at other religious ceremonies. The greater part of these altars are raised upon a little hill, either natural or artificial. Three long pieces of rock, set upright, serve as a basis for a great flat stone, which forms the table of the altar. There is commonly a cavity under the altar, which might be intended to receive the blood of the victims, and they never fail to find stones suitable for striking fire scattered around it, for no other fire but such as was struck forth with a flint was suitable for so holy a purpose. Sometimes these rural altars were constructed in a more magnificent manner; a double range of enormous stones surrounded the altar and the little hill on which it was erected. In Zealand we see one of this kind." In the north of Europe to this day cromlechs are known by the name of blod, *i.e.* blood stones; and in the county of Louth in Ireland is a cromlech called the Killing-stone, the hill on which it stands being also known as the Killing-hill; the name, though of course comparatively modern, may be reasonably supposed to mark an older tradition. Lastly, we may observe that existing customs bear strongly upon this point. Mr. Downes*, speaking of an

* 'Letters from Mecklenburgh and Holstein,' p. 102.

immense cromlech at Albersdorf on the confines of Holstein, says that a well informed man told him "that the cromlech was an altar for sacrifice; and that there was another in the village of Bedel, near the river Elbe, surrounded with oaks in a garden; and that it was customary to offer sacrifices upon these cromlechs before a person began ploughing, and before he was married; that no one entered this grove without making a present; and that no one swept the cave (under the cromlech) without finding money." It is a remarkable fact that a human sacrifice took place in Britain so late as 893. Einar, Thane or Earl of Caithness, made Haldanas, prince of Norway, prisoner. With horrible solemnity a sacrifice was prepared, and the victim offered up to Odin: a tumulus was erected on the spot to perpetuate the memory of the event.

The kist-vaen has often been confounded with the cromlech, nor does it seem easy to point out the differences with precision; the chief distinction appears to be this:—that whilst the cromlech is merely a large flat stone supported by three or more smaller ones, the kist-vaen (consisting generally of three stones beneath and one above) forms a regular square-shaped cell, or, as its name expresses, stone-chest, open only on one side as if for a door. One of the most perfect specimens existing is that called Kit's Cotty House, in Kent, of which we present an



[Kit's Cotty House.]

engraving. Kist-vaens are commonly found in the middle of stone circles, sometimes with and sometimes without a cromlech standing near. They are also occasionally found isolated, and there are instances of circles being formed by kist-vaens, with and without a cromlech in the centre, but we believe there is no instance known of a kist-vaen standing within a circle of cromlechs. There are two other modes in which kist-vaens are found disposed:—one where cromlechs and kist-vaens together form a circle; and the other where the circle consists of kist-vaens and upright stones disposed alternately. A remarkable example of this last arrangement is found in the Druidical circle of Jersey, of which an engraving was given at page 308.

Like the cromlech, the kist-vaen has been supposed to have been intended for the purposes of sacrifice or of sepulture, whilst other writers suppose that both these monuments were merely greater and lesser altars, the cromlech probably for the more awful portion of the ceremonies—the sacrifices, the kist-vaens for oblations. "We were," observes the editor of the 'Pictorial Palestine,' "for a time inclined to this opinion, but on careful deliberation, and considering that the first tabernacles and constructed temples are to be taken as commentaries on the stone-monuments of more ancient date, we felt more disposed to find an analogy between the kist-vaen, or stone-chest, and the ark, or sacred chest, which we find as the most holy object in the tabernacle and temple of the Hebrews, as well as in the Egyptian and some other heathen temples."* Davies, and, more recently and powerfully, the Rev. G. S. Faber, in his great work 'On the Origin of Pagan Idolatry,' contend that this form of the ark or chest, so prevalent in all the ancient religions of the world, commemorated the ark of Noah, which formed as it were the womb or cradle of the postdiluvian races of mankind, and which, as such, was exceedingly liable to become an object of symbolization, and of type and figure. Thus, from the writings of the ancient bards, of whom we have before spoken, we gather many mystical allusions to a chest (or, as some even have it, a *stone*-chest) or ark, in which those about to be initiated in the mysteries of Druidism underwent confinement, and a severe probationary penance; it also appears that the confinement was designed to shadow out a confinement in a ship floating upon the water. A curious corroborative evidence of this last idea appears to be furnished by the springs of water sometimes found under the kist-vaen. One of the most striking passages of the nature just alluded to, is that adduced by Davies; in which Taliesin describes his probation: "I was first modelled in the form of a pure man in the hall of Ceridwin, who subjected me to penance. Though small within my ark, and modest in my deportment, I was great. A sanctuary carried me above the surface of the earth. Whilst I was enclosed within its ribs, the sweet Awen rendered me complete," &c. The kist-vaen is, then, very probably the ark here referred to; certainly there is no other Druidical remain at all adapted for the purposes described. We must not conclude this paper without noticing that the kist-vaen, like the other Druidical monuments, is found in different and remote parts of the world. Captains Irby and Mangles thus describe some specimens they found in Palestine: "On the banks of the Jordan, at the foot of the mountain, we observed some very singular, interesting, and certainly very ancient tombs composed of great rough stones, resembling what is called Kit's Cotty House in Kent. They are built of two long side stones, with one at each end, and a small door in front, mostly facing the north: this door was of stone. All were of rough stones, apparently not hewn, but found in flat fragments, many of which are seen about the spot in huge flakes. Over the whole was laid an immense flat piece, projecting both at the sides and ends. *What rendered these tombs the more remarkable was*, that *the interior was not long enough for a body, being only five feet.* This is occasioned by both the front and back stones being considerably within the ends of the side ones. There are about twenty-seven of these tombs, very irregularly situated." The passage we have marked in Italics proves, we should think, very decisively that the structures were not tombs. We shall conclude this subject in our next.

* 'History of Palestine,' book 3, chap. iv., p. 432.

SKETCHES OF THE COASTS FROM SINGAPORE TO PEKIN.

VI.—COMMERCE OF THE CHINESE.

[Continued from No. 536.]

It may not here be amiss to say a few words concerning the commerce carried on by the Chinese in their own junks. This commerce appears gradually to have contracted its sphere. Indeed if we may believe their own relations, their empire, too, has considerably fallen away, for in good old times, say the historians, it extended as far as the Cape of Good Hope. Doubtless, then, their commerce reached far beyond. But be this as it may, certain it is that whilst the Portuguese were gliding into India, the Chinese junks traded at Cochin and Cananor. It is rare, however, now to see a Chinese prow project itself beyond Acheen, and their regular commerce is only between those islands which are thought either to have been torn from the main land or to be the first indications of a rising continent,—we mean the islands of Japan, the Philippines, the Moluccas, &c. Of all these, next to Batavia, Japan is the place most frequented by the Chinese merchants, who formerly indeed carried on

a prodigious commerce with this empire. In process of time, however, the Japanese, taking umbrage at the immense concourse of foreigners, confined them to a certain quarter near the Dutch island, where they were subjected to many vexatious regulations, now partially relaxed. They are allowed to have three annual sales; one in spring, when they are permitted to unload twenty junks, a second of thirty junks, and a third, in the autumn, of twenty. If any arrive besides these, they are sent back. They commonly set sail in the month of June or July, at the latest. They commonly go first with Chinese commodities to Camboja, Siam, or Tonquin, where they load cargoes, such as ox, buffalo, and deer hides, silk, &c., for which there is likely to be a demand in the Japanese market. One article of commerce may appear extraordinary, considering the well-known antipathy of this people to pork, which is, that a number of swine are annually brought from China, but they are only sold in retail to the Chinese merchants, who are passionately fond of this meat, during their stay.

Formerly the Chinese carried on a great trade to Ternate, but the Portuguese first, and afterwards the Dutch, spoiled their traffic in that quarter. The latter now never suffer them to advance beyond Macassar. Indeed the Chinese are the only people who are allowed to trade at all to this vast island, whose inhabitants in return send great quantities of fish to the ports of the Celestial Empire. They entertain great fishing fleets of more than a hundred sail all round their coasts, and go out with one monsoon and return with another. The crews of these ships are from sixteen to twenty, and the burden from twelve to twenty tons. The suallo or sea-slug speared by them is sold, when black and very superior, to the Chinese for forty dollars each, whereas the white bring only from four to five.

The Sooloos sometimes carry the Chinese commodities to Ternate, and bring back rice, suallos, shark-fins, tortoise-shells, some small pearls, and abundance of loeri parrots. But the Dutch are too jealous to allow any of the more precious products of the Spice Islands to pass through any other hands than their own. If any is smuggled, it is in exceedingly small quantities.

The Chinese traffic also (but only by sufferance of the Dutch, from whom they are compelled to obtain passes) with the Papuans and inhabitants of New Guinea, to whom they carry iron tools, chopping-knives and axes, beads, plates, basins, &c. The return cargoes consist of misory bark, procured eastward of Dory, at a place called Warmasine or Warapine, and is sold for thirty dollars a pecul at Java, where the natives reduce it to powder to rub their bodies with. To the same use the natives apply a decoction of sandal-wood brought from the Timor and Sooloo Islands. The Papuans trade also in slaves, ambergris, suallos, tortoise-shell, small pearls, black loeries, large red loeries, birds of paradise, and many species of dead birds dried in a peculiar manner. The birds of paradise are either shot with arrows or caught with lime or nooses. When entrapped, they defend themselves vigorously with their bills, but are instantly killed, drawn, and the breast-bone taken out. After this they are dried with smoke and sulphur, and sold to foreign merchants for mere trifles, such as spike-nails or bits of old iron. From the Molucca Islands, too, is exported a delicate species of bird caught in great numbers by the natives with limed twigs. These birds live in trees (*Erythrina corallodendron*) which wave their elegant coral-coloured spikes of flowers all round the shores of these islands over the sea.

Borneo also is visited by the Chinese junks. In one part of this island the principal medium of exchange or currency consists of great lumps of bees'-wax, some thirty-four pounds in weight, or else the few pearls which are there found. These the natives barter with the Chinese for various commodities. They also export camphor, diamonds (inferior to those of Golconda), gold, drugs, pepper, cassia, gum, several sorts of dyes, edible birds' nests, and shark-fins.

Manilla, the capital of the Philippine Islands, has been sometimes visited by four hundred Chinese junks yearly, bringing silks, satins, flowered and embroidered works, carpets, cushions, morning gowns, silk stockings, tea, porcelain, varnished works, drugs, &c. They also carry great flat cakes of oranges of a delicate taste, much valued in Mexico, whither they are transported by the Acapulco galleons as a great dainty. The lading of this galleon generally consists of muslins, painted cloths, coarse cotton shirts, raw silks, goldsmiths' work, made at Canton or at Manilla by Chinese workmen, spices, and aromatics. Quicksilver likewise was attempted to be made an article of commerce with Mexico through the medium of Manilla in 1782; but the quicksilver, besides being very dear and rare, was discovered to be of an inferior quality and mixed with lead. The scheme accordingly failed for the moment. The Chinese bring back from Manilla, as well as from the Celebes, Sooloos, and Molucca Islands, edible nests, mother-of-pearl, tortoise-shells, and bêche de mer. In the Sooloo Islands the swallows, whose nests are so much coveted in China, build in caves open below to the sea, and above by a small inaccessible aperture to the open air. They are procured by divers, who plunge into the entrance and rise within the vast caverns. There they cut away as many nests as they can carry, and return the way they came.

Another quarter to which the Chinese trade is westward to Tonquin, Cochin-China, Siam, and the Malay countries. To the latter, but especially to Patane, they carry porcelain, wrought-iron, dried and salt meat, fish, &c. For the latter article they are famous, their dried and salt provisions being reckoned the best in the world. They even contrive, by covering them with a coating of clay impregnated with salt, to preserve eggs, which are deemed so wholesome, that sick persons are allowed to eat them.

To Siam the Chinese carry their wines and all the commodities mentioned above. Corals too, made of many loose teeth bound together with brass wire, are enumerated among their articles of commerce. It may also be mentioned as a trait of manners, that immodest paintings and statues in porcelain are publicly traded in by the Chinese at Siam.

From Patane they take back divers kinds of wood, cords made of the fibre of the palm-tree (which they use for rigging, and to bind together the beams of their roofs), rice, cocoa-nut oil, fruit, and buffalo, bullock, goat, deer, rabbit, and hare skins, which the peasants dry against their coming, and bring into the town in the proper season. Along the rocks also are found numbers of the edible birds' nest so prized in China. From Sumatra also the Chinese fetch ivory and bees'-wax; and from the Malay countries generally, timber, barks, scented woods, tin, Malayan camphor, pepper, opium, and a few European commodities.

The list of exports afforded by Siam is very rich. Among other things, pepper, gamboge, cardamums, perfumed wood, fancy wood, dye-wood (among others, log-wood, like that cut in Campeachy), hides, horns, bones for manure, ivory, feathers, &c. The paws also of the brown and black bear, much esteemed in China, are brought salted from Siam and Camboja, as well as from Tartary.

Camboja, Cochin-China, and Tonquin afford all these articles except pepper, and, besides them, cinnamon, betel-nuts, varnish, and dye stuffs; in return for which, among other things, the merchants of Fo-kien carry great quantities of musk.

From this outline of Chinese commerce it will appear that, in spite of the awkward build of their craft, they are by no means contemptible merchants. In fact, with

so extensive a coast, such a profusion of harbours, and so many rich commodities as this country abounds with, it would be very surprising if this were not the case. The principal impediments to commerce are two: first, the typhoons, which prevail at the equinox; second, the corsairs, who ever and anon infest the seas. "There have been pirates," says Yung-lun-yuen, in his 'History of the Chinese Pirates,' "from the oldest times on the eastern sea of Canton; they arose and disappeared alternately, but never were they so formidable as in the years of Kea-King, at which time, being closely united together, it was indeed very difficult to destroy them." In spite of the boasted police regulations of the empire, pirates often rendered the passage from Hongsham to Canton excessively dangerous; and it was only by underhand influence that the sea robbers alluded to by Yung-lun-yuen, and who flourished in the beginning of this century, could be subdued. The exploits of Koshinga are remembered by all, and the Europeans have not been without a share in these piracies, for the Dutch often extended their incursions into the very bay of Canton, with the professed purpose indeed of annoying the Portuguese, though, doubtless, little caring what booty they obtained, so as no evil consequences were threatened to themselves.

[To be continued.]

THE USES AND THE MANUFACTURE OF A SHIP'S ANCHOR.—No. I.

Among the peculiarities which distinguish a floating body from one that moves on land is the difficulty of staying the progress when motion is no longer desirable: however valuable winds and currents may be as sources of motion, yet the very facility which they present for that purpose renders it difficult to stop a floating body, such as a ship, when under the influence of either. In fact, no plan has hitherto been devised but that which may, in familiar terms, be called hooking the floating body to the solid bed beneath the water; for an anchor may be deemed a hook, caught or entangled in the solid bed beneath the ocean, and connected with the ship by a rope.

The early substitutes for an anchor seem to have been large stones, baskets full of stones, logs of wood loaded with lead, sacks filled with sand, and other rude and heavy contrivances. The anchors of the ancient Greeks are said to have consisted usually of large stones, which did not, like modern anchors, penetrate into the soil beneath the sea and so cling there, but merely retained the vessel by their inertia and by their friction along the bottom. The notable improvement was when iron flukes, spikes, or teeth were so fixed to the heavy body as to be able to penetrate into the ground, and thus take firm hold: this improvement is attributed by some to Midas, king of Phrygia; and by others to the Tuscans. These iron anchors had at first only one fluke or tooth, but afterwards they had two; and there appears to have been no very great difference between the anchors of the time of Pliny and Strabo, and those of our own day, in outward appearance, except in the absence, in former times, of that part which is called the stock.

In our own day, boats and other small vessels employ what are called grapnels, consisting of a series of five or six hooks arranged round in a circle, so that one or other of them is almost certain to cling to the ground or to any other body when thrown upon it. In the East Indies a sort of anchor is employed called the mushroom anchor, from its great resemblance in shape to that plant: it is a hollow cup, the edge of which digs into the ground and clings to it sufficiently firm to maintain a hold. Anchors of a peculiar kind have sometimes been used under the name of floating anchors. These are intended to stay the beating about of a vessel in some degree at spots where the sea is too deep to be fathomed by the cable to which a regular anchor is attached. One suggestion for this purpose was a stem of wood, twenty-five feet long and four inches square, with four boards, eighteen, sixteen, fourteen, and twelve feet long respectively, and one foot in width, with a hole in the middle of each about four inches square, so that it might occasionally be slipped upon the stem at right angles with it. This was proposed to be thrown into the sea, and retained at a certain distance by a rope, in such a position that the resistance offered by its service might in some degree control the movement of the vessel. Another suggestion was as follows:—Two long iron bars are riveted together at the centre, and ropes stretched tightly from end to end of the bars, so as to form a square frame-work. Over this frame is stretched a doubled or quadrupled sailcloth, well secured to the ropes. In each bar are two holes, at equal distances from the centre; and to these holes the ends of two pieces of rope are fastened, the other ends of which are connected to a rope kept on board. The machine thus forms a sort of large water-kite, and is thrown into the water, where it is prevented from sinking to a greater depth than twelve fathoms by a rope which connects it with a buoy floating on the sea. The large surface which the machine exposes to the sea was expected to be serviceable in retarding or steadying the motion of the vessel. Numerous other contrivances, having the same object in view, have been from time to time proposed, but none have been found to answer the desired purpose; and we believe that no such thing as a floating anchor is used in the royal navy.

Another kind of anchor occasionally employed is that called the mooring anchor, used for securing vessels in certain situations in harbour or roadsteads. As these anchors do not require to be lifted into the ship, but are fixtures in the harbour, there is no need to adopt any particular form, provided the weight be sufficient to retain a vessel in its place. A mooring anchor often consists merely of a ponderous block of stone, with a ring fixed in the middle of the upper side; or several large stones are fastened together, so as to make one effective whole. Sometimes one of the largest anchors used for a first-rate ship, weighing eighty hundredweight, is selected, and one of the arms or flukes is beaten down close upon the shank, to prevent it from entangling the cable connecting the vessel with the anchor: this is usually done only when one of the flukes of a large anchor is damaged and unfit for use. About thirty years ago Mr. Hemman of Chatham devised an improved form of mooring anchor, made of cast-iron, and very massive. The form bore some resemblance to that of a spade; and when the edge had once penetrated the ground beneath the water, it was calculated to take a very firm hold.

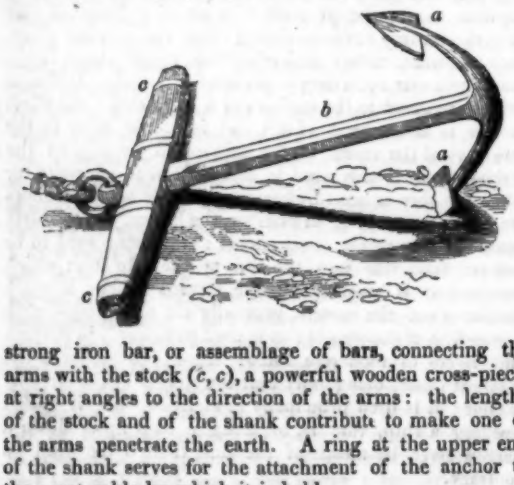
But the anchors most important of all are those which a ship carries on board, and which are used as occasion requires to stop the progress of a vessel. Ships of the first class carry seven anchors; and the smallest class, such as brigs, cutters, and schooners, usually have three, varying in size according to the class of vessel. Different names are given to the anchors of a large ship: the sheet anchor is the largest of all, and is stowed away in the fore part of the vessel, on the side called by seamen the larboard; it is only used in cases of great necessity, or when the ship is beset by heavy gales: the bower anchors are either two or three in number, the largest being nearly equal in size to the sheet anchor; the name used to be bowyer, from the bow, the end of the ship from which the anchor is suspended: the stream anchor is much smaller than the bowers, generally not above one-fourth or one-fifth of the weight; it is used principally in streams and rivers of moderate force: the kedge anchor is the smallest of all, being only half the weight of the stream-anchor; it is used principally to assist in what is called kedging a ship, that is, to bring a ship up or down a narrow river by means of the tide, though the wind be contrary.

The largest anchor in a first-rate man-of-war weighs

as much as ninety hundredweight; in an eighty-gun ship, seventy-six hundredweight; in a seventy-four-gun ship, sixty-eight hundredweight; and so on down to the smaller vessels. The cost for labour in the manufacture of anchors varies from twenty-four to sixty shillings per hundredweight, according to the size of the anchor, the largest sizes being more expensive in proportion: the total expense of one of the largest anchors is about 300*l*.

In order to understand the mode in which the fluke of an anchor is made to cling to the ground when cast into the sea, it will be necessary to speak of its general form. The first cut represents an anchor in its vertical position and the second its position when one of the flukes has penetrated the soil beneath the sea. The hooked arms (*a*, *a*) are terminated at the ends by tolerably sharp points,

calculated to penetrate into the ground; and when one of these arms has taken fast hold, the motion of the vessel tends rather to increase that hold than to diminish it, on account of the concave form which the arm presents: the vessel can then only move by one of three things happening—the fracture of the arm from the other part of the anchor; the fracture of the cable connecting the anchor with the ship; or the ploughing up of the soil by the arms immersed in it, and the consequent liberation of the anchor. The extremity of each arm is increased in width, and forms the blade, on which is fixed a broad, flat, triangular plate, called the palm: the use of this palm is, by exposing a broad surface, to take a firmer hold of the ground. The peak, or bill, is the sharp extremity which first penetrates into the ground. Sometimes each arm is curved, as we have stated; but in other instances it is quite straight, the two arms making a definite angle with the shank or upright portion. This shank (*b*) is a



strong iron bar, or assemblage of bars, connecting the arms with the stock (*c*, *c*), a powerful wooden cross-piece, at right angles to the direction of the arms: the lengths of the stock and of the shank contribute to make one of the arms penetrate the earth. A ring at the upper end of the shank serves for the attachment of the anchor to the great cable by which it is held.

Were it not for the cross-piece called the stock, it would be difficult to ensure the catching of either of the arms in the ground; but they enable that effect to be almost always ensured in the following manner:—the anchor, when on board, is placed in a situation convenient for dropping into the sea. To the ring is attached one end of a cable, which is either a stout rope or an iron chain; and this cable is arranged along the deck in long coils, perfectly free from all confusion or entanglement, the remote end of the cable being firmly attached to a proper place on deck. Nautical phraseology and technical terms are so little understood by landsmen, that we must not attempt to detail the manœuvres by which the anchor is freed from its fastenings; we will therefore merely say, that when it is let go, it falls into the sea, descends rapidly, and draws the cable after it so violently, that it is often necessary to throw water on the woodwork against which the cable rubs, to prevent it from taking fire. The anchor pitches violently on the ground with the arms downwards, and neither peak in such a position as to enter the ground; but it presently falls over, and in so doing, the position of the stock at right angles to the arms, and its length and height, together with the weight of the cable, are sure to throw it with one of the arms pointed into the ground. Where the ground is known to be so soft that the anchor will not take firm hold, it is a plan sometimes adopted to cover the arms with a broad triangular piece of plank, much larger than the arm itself. The more horizontal the cable is which connects the anchor with the ship, the less likely is the arm of the anchor to be dragged from its hold.

The weighing of an anchor, or the drawing it up from the anchoring ground into the ship, is an operation requiring the joint exertions of a great number of men. A sort of windlass, on a very enormous scale, called a capstan, is erected in a particular part of every ship, and round this windlass the cable holding the anchor is wound; or, if the cable be of too great diameter, a smaller rope, wound round the windlass, draws in the cable. The capstan has a number of holes arranged round its circumference, and into these holes the seamen insert long bars, which then appear like radii, or spokes of a wheel; the bars act as levers, and by their aid the men are enabled to turn the capstan. The vessel is gradually drawn nearly vertically over the anchor, which is thus raised on end, and liberated from its hold on the ground without difficulty; the anchor is then weighed, and stowed away in its proper place.

An anchor of the largest size is a ponderous mass, although apparently trifling when seen in its place on board. An anchor of ninety-four hundredweight is of the following dimensions:—length of the shank about nineteen feet; and of the square end to which the stock and the ring are attached, above three feet: the thickness of the shank varies from eight to twelve inches, each arm is more than six feet in length, and the triangular palm at the end of it measures three feet in each direction: the ring to which the cable is attached is three feet in diameter, and made of iron five inches in thickness; the stock or cross-piece is about the length of the shank.

In a second paper on this subject we shall attempt to convey an idea of the manner in which the mass of metal constituting an anchor is put together, an operation concerning which some spirited lines will be found in 'Penny Magazine' (vol. v., p. 39). We may here remark, that since the conclusion of the war many improvements have been suggested, and partially introduced, in the construction of anchors, particularly by Lieut. Rodgers; but it will be sufficient to give a general view of the subject if we describe the common mode of making anchors such as were used in the royal navy throughout the war.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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